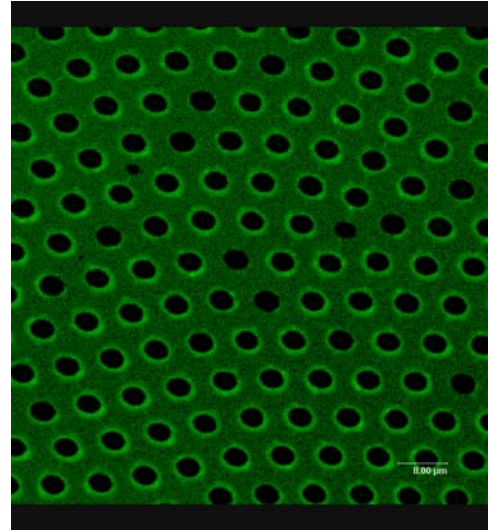


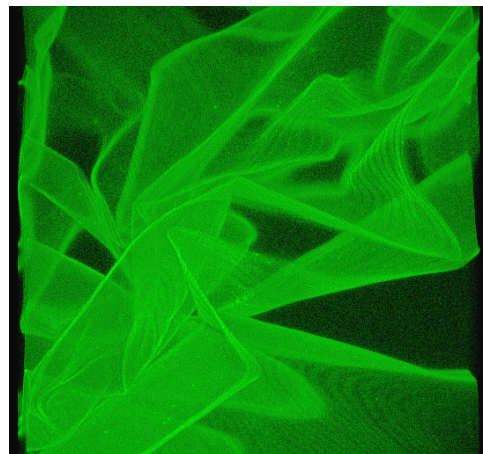
### Decorated Breath Figure

The formation of so-called “breath figures” by condensation of micron-sized water droplets on the surface of a polymer solution, and the self-assembly of CdSe nanoparticles at the polymer solution-water droplet interface have been combined to form hierarchically structured nanoparticle arrays. Complete evaporation of the solvent and water forms an array of nanoparticle decorated spherical cavities and allows for ex-situ investigation. This process opens new ways for the generation of highly functionalized ordered microarrays of nanoparticles, potentially useful for applications such as sensors, separation membranes or catalysis. (A. Böker, Y. Lin, K. Chiapperini, R. Horowitz, M. Thompson, V. Carreon, T. Xu, C. Abetz, H. Skaff, A. D. Dinsmore, T. Emrick and T. P. Russell, "Nanoparticle Self-Assembly in Polymer Film by Solvent Evaporation," *Nature Mats.* advance online publication(18/04/04 (doi: 10.1038/nmat1110).) (2004)).



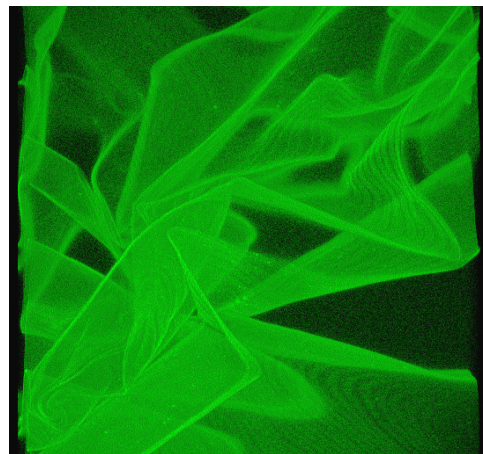
## Interfacial Assembly of Nanoparticles

The fabrication of functional nanostructured materials requires practical approaches to self-assembly on multiple length scales. Here, the directed self-assembly of functionalized, luminescent nanoparticles at oil-water interface, followed by crosslinking of the associated ligands, affords robust membranes. These composite membranes, nanometers in thickness, are shown to be effective diffusion barriers that have potential applications in controlled encapsulation and release. Cadmium selenide (CdSe) nanoparticles were used, since the photoluminescence of the particles provides a convenient means to monitor the spatial organization of the nanoparticles. The retention of the CdSe photoluminescence demonstrates that the nanoparticles remain unchanged during the manipulation. The concepts shown are non-specific and can be adapted to any nanoparticle and solvent combinations. (Y. Lin, H. Skaff, T. Emrick, A. D. Dinsmore and T. P. Russell, "A Membrane of Cross-Linked Nanoparticles," J. Am. Chem. Soc. 125, 12690-12691 (2003)).



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## Visual

The recently launched VISUAL program, where images obtained by researchers at the Center in the course of their studies, are framed along with a description of the image in plain English, has received nationally acclaim from Nikon in their Small World Exhibition. One image (Frazzled) from the VISUAL program has been included within the Nikon 2004-2005 Gallery. Images from VISUAL have been used in the New Jersey State Science Museum which included their Super Science Weekend and are now being hung in the Franklin Medical Center, Greenfield, MA, reaching directly to the public. VISUAL was also highlighted by the Optical Society of America in Optics and Photonics News and the American Chemical Society in Chemical and Engineering News for its originality in bringing science to the public sector. (L.Strzegowski, T.P. Russell, Microscopy Today, May 2004)

